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October 28, 2009

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VIA ELECTRONIC DELIVERY

Marlene H. Dortch, Secretary
Federal Communications Commission
445 12th Street, SW
Room TWA325
Washington, DC 20554

**Re: Notice of *Ex Parte* Presentation
ET Docket Nos. 04-186, 02-380**

Dear Ms. Dortch:

On October 27, 2009, Joseph M. Sandri, Jr., Senior Vice President of Government and Regulatory Affairs for FiberTower Corporation ("FiberTower"); Richard Engelman, Director, Spectrum Resources-Government Affairs, Sprint Nextel Corporation ("Sprint Nextel"); and Michele C. Farquhar of Hogan & Hartson, LLP, Counsel to Sprint Nextel and Special Counsel to FiberTower and the Rural Telecommunications Group, Inc., met with Julius Knapp, Alan Stillwell, Bruce Romano, Ira Keltz, and Geraldine Matise of the FCC's Office of Engineering and Technology, and with Wayne McKee, John Gabrysch, and Shabnam Javid of the Media Bureau.

During the meeting, the representatives discussed their Request for Expedited Consideration of their Petition for Reconsideration, filed in this proceeding on July 14, 2009, as well as the attached slides and revised proposed technical rules for licensed, fixed use of the TV Bands White Spaces ("White Spaces"). The parties highlighted the urgent need for the Commission to act immediately to permit licensed, fixed use of a portion of the vacant White Spaces channels to provide dramatically more cost-effective backhaul options and facilitate the goals of the broadband stimulus funding programs. The parties reiterated their proposal to allow licensing for fixed use on UHF TV Channels 21-35 and 39-51 of: (1) up to six vacant White Spaces channels second or greater adjacent to a TV broadcast station in rural counties; and (2) any vacant White Spaces channels third or greater adjacent to a TV broadcast station in all counties.

Specifically, the parties noted the benefits of licensed use of the White Spaces, including the exceptional propagation features of the band (which are ideal for lower-cost backhaul over much longer distances and offer significant cost savings compared to other spectrum bands) and the promotion of build-out in rural areas. They also discussed their comparative survey of various microwave and TV Bands fixed path lengths available in Utah, including the existing number of links, the average and maximum length of the links, antenna gain, and antenna size issues, highlighting the many advantages of the TV Bands channels for point-to-point services such as backhaul. In addition, the parties described the smaller, lighter, and less expensive antennas available for the TV Bands. In response to a question, the parties confirmed that equipment would be available off-the-shelf for UHF Channels 21-51 but not for the VHF Channels (and that more expensive, larger, and heavier antennas would be needed, once available, for the VHF Channels). Finally, the parties noted that the 6 GHz band is already heavily used and, as a result, there would likely be many locations where additional 6 GHz links are unavailable, including in rural areas.

Pursuant to Section 1.1206 of the Commission's rules, this letter is being filed via ECFS with your office.

Respectfully submitted,

/s/ Michele C. Farquhar

Michele C. Farquhar
Counsel to Sprint Nextel Corporation
Special Counsel to FiberTower Corporation
and Rural Telecommunications Group, Inc.

cc: Julius Knapp
Alan Stillwell
Geraldine Matise
Bruce Romano
Ira Keltz
Wayne McKee
John Gabrysch
Shabnam Javid



Licensed, Fixed Use of the TV White Spaces

October 27, 2009



Chronology of Major Events

- October 18, 2006 – FCC releases First R&O/Further Notice inviting comment on licensed operations in TV bands
- October 2, 2007 – FiberTower and RTG file their “White Paper” proposing a licensed, fixed model
- January-October, 2008 – Sprint Nextel, T-Mobile, NTCA, COMPTTEL, and the Rural Independent Competitive Alliance file letters of support
- June 25, 2008 – COMPTTEL, RTG, Sprint Nextel, and FiberTower submit draft of proposed technical rules

Chronology of Major Events

- October 29, 2008 – RTG, COMPTTEL, Sprint Nextel, and FiberTower submit revised proposed technical rules
- November 4, 2008 – FCC adopts Second R&O/MO&O
- March 19, 2009 – FiberTower, RTG, COMPTTEL, and Sprint Nextel file Petition for Reconsideration
- June 12, 2009 – DTV transition completed
- July 14, 2009 – FiberTower, RTG, COMPTTEL, and Sprint Nextel file Request for Expedited Consideration of their Petition for Reconsideration

Benefits of Licensed, Fixed Use

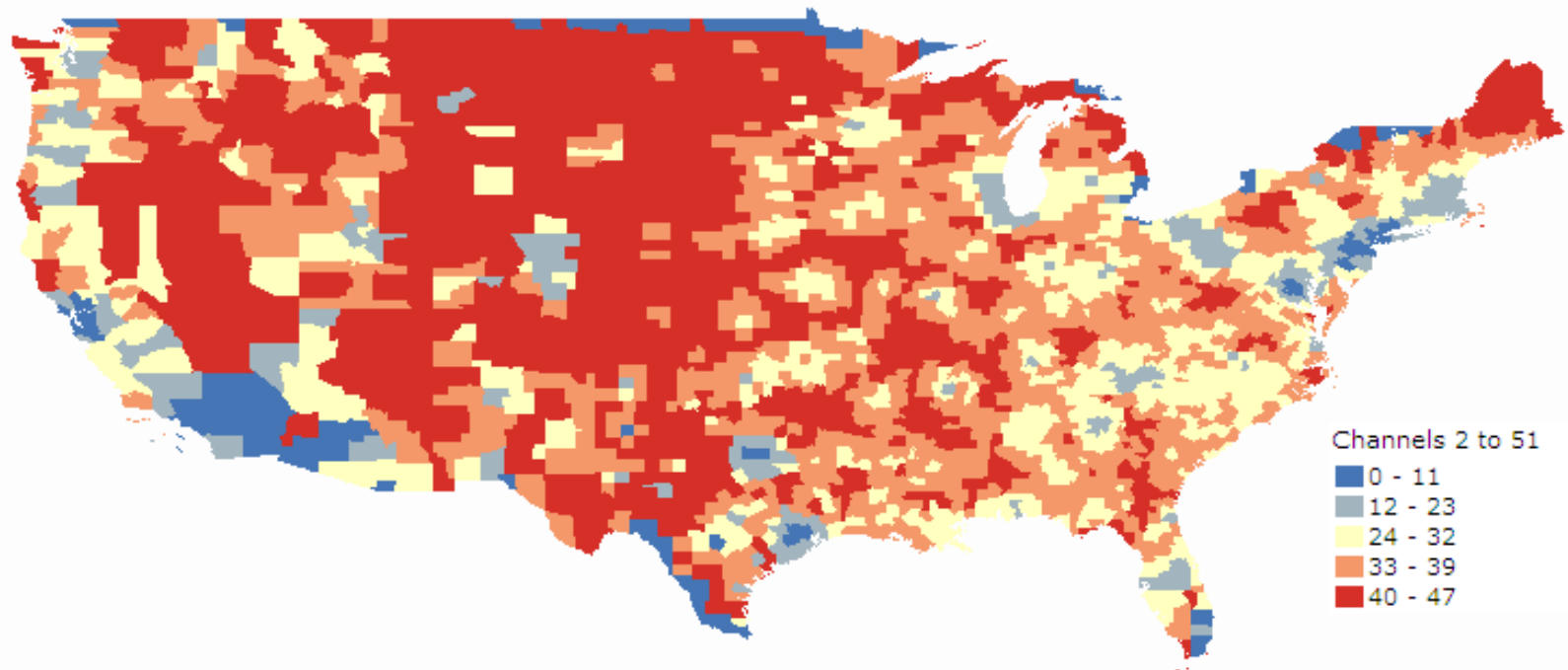
- Ideal for long-range, inexpensive wireless backhaul, particularly in rural areas
- Equipment available now; would spur immediate broadband deployment to unserved and underserved rural areas and benefit consumers directly
- Fosters regulatory certainty and protects incumbent users, particularly broadcasters
- Other unlicensed or licensed uses not precluded

Licensing

- Site-by-site basis under Part 101
- Only on UHF TV Channels 21-35 (512-596 MHz) and 39-51 (620-698 MHz)
- Make available six vacant channels in rural counties; must be 2nd or greater adjacent channel to TV broadcast station
- Also make available 3rd or greater adjacent channels in all counties

How Much TV White Space Exists?

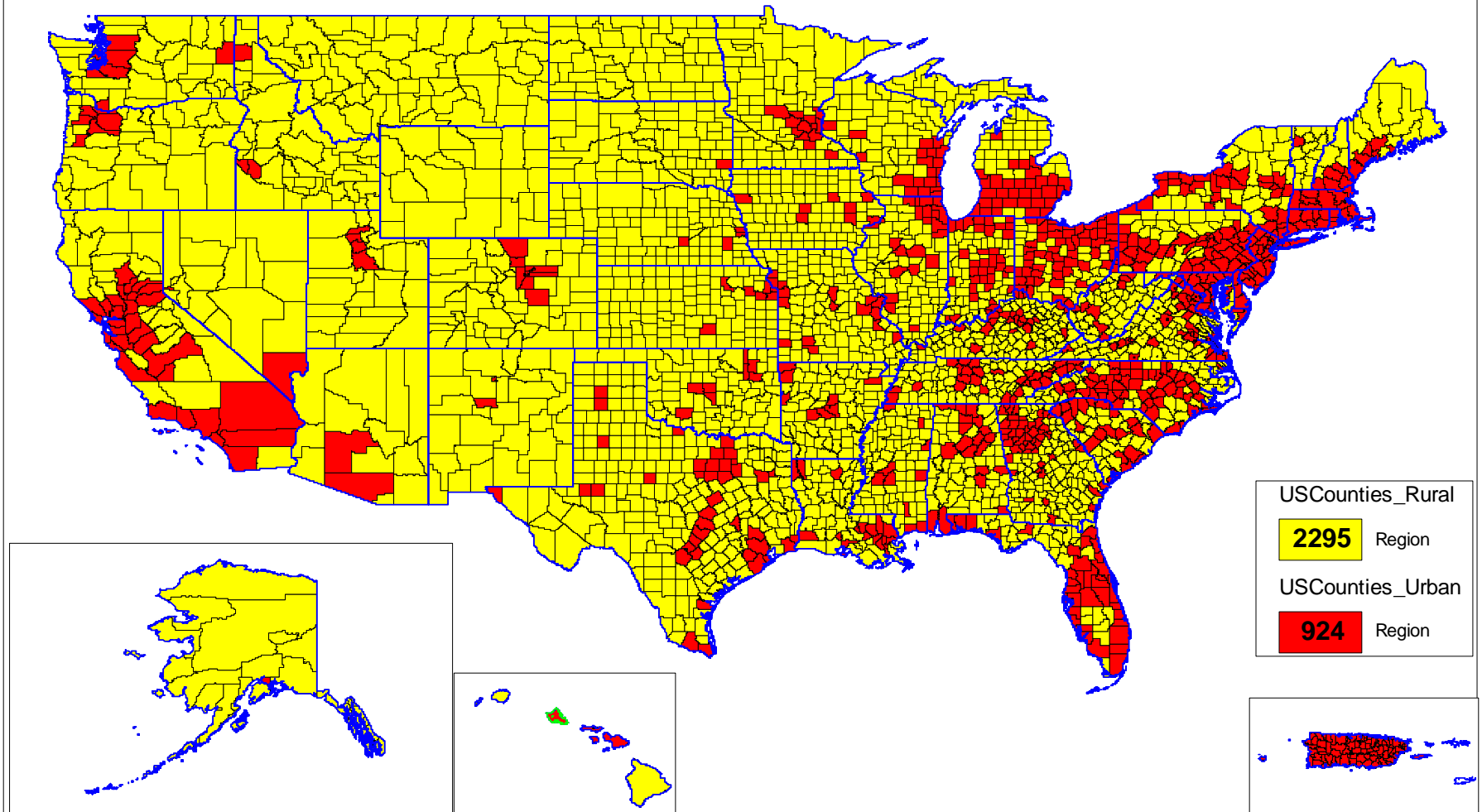
White Space Availability by County



Source: *Ex Parte Letter*, October 1, 2009, filed in ET Dkt. 04-186 by Wiltshire & Grannis LLP, on behalf of Dell, Inc., Microsoft Corp., and Spectrum Bridge Inc.

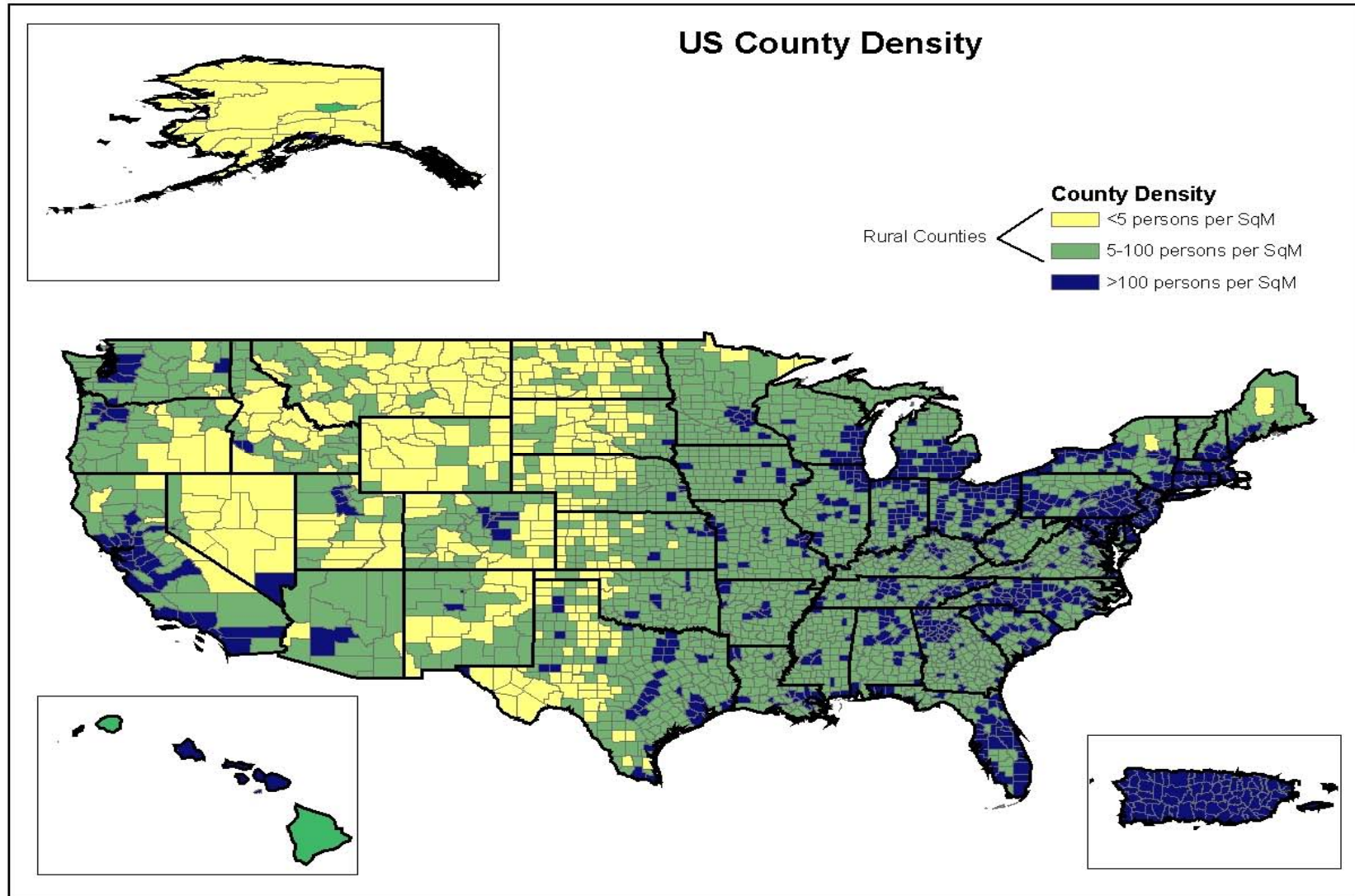
Rural Areas Have Lots of White Space

Note: Urban = POP Density ≥ 100 pers/sqmi , Rural = POP Density < 100 pers/sqmi



10/27/09

Rural Areas Have Lots of White Space



Source: FCC's 13th CMRS Report (2009)

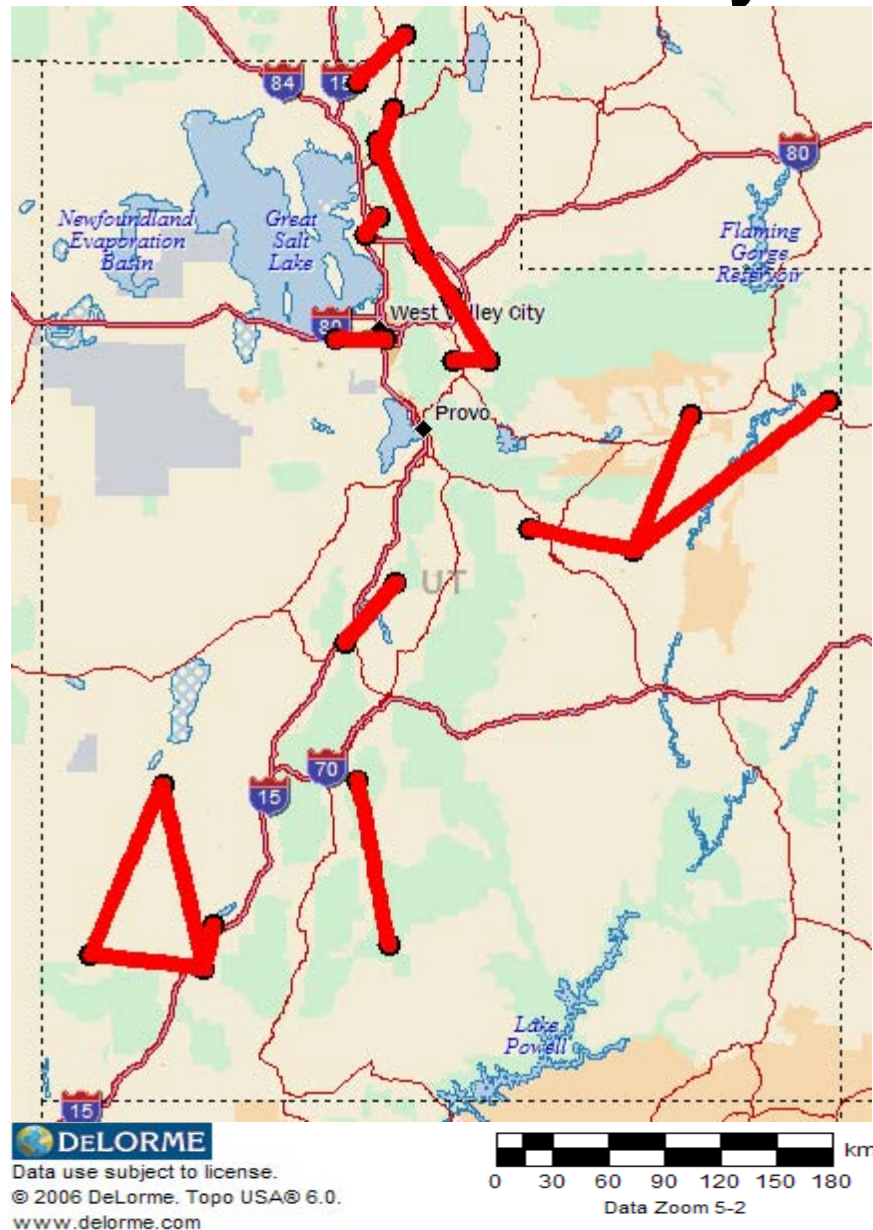
Data Rates

- When received signal-to-noise ratio is sufficient, links would be able to operate with up to 128 QAM (maximum data rate ~ 41 Mbps in 6 MHz channel)
 - 64 QAM likely to be more typical; max. data rate ~ 28 Mbps gross, and 20-25 Mbps net after coding
 - Rate could be doubled by using dual polarization
 - Rates could be less for longer links with low received signal-to-noise ratio

TV Band Links in Use Today

25 licensed TV band fixed links in Utah:

- range in length from 11.7 km (7.3 mi.) to 131.3 km (81.6 mi.)
- six links longer than 65 km (40 mi.)
- average length is 51 km (32 mi.)

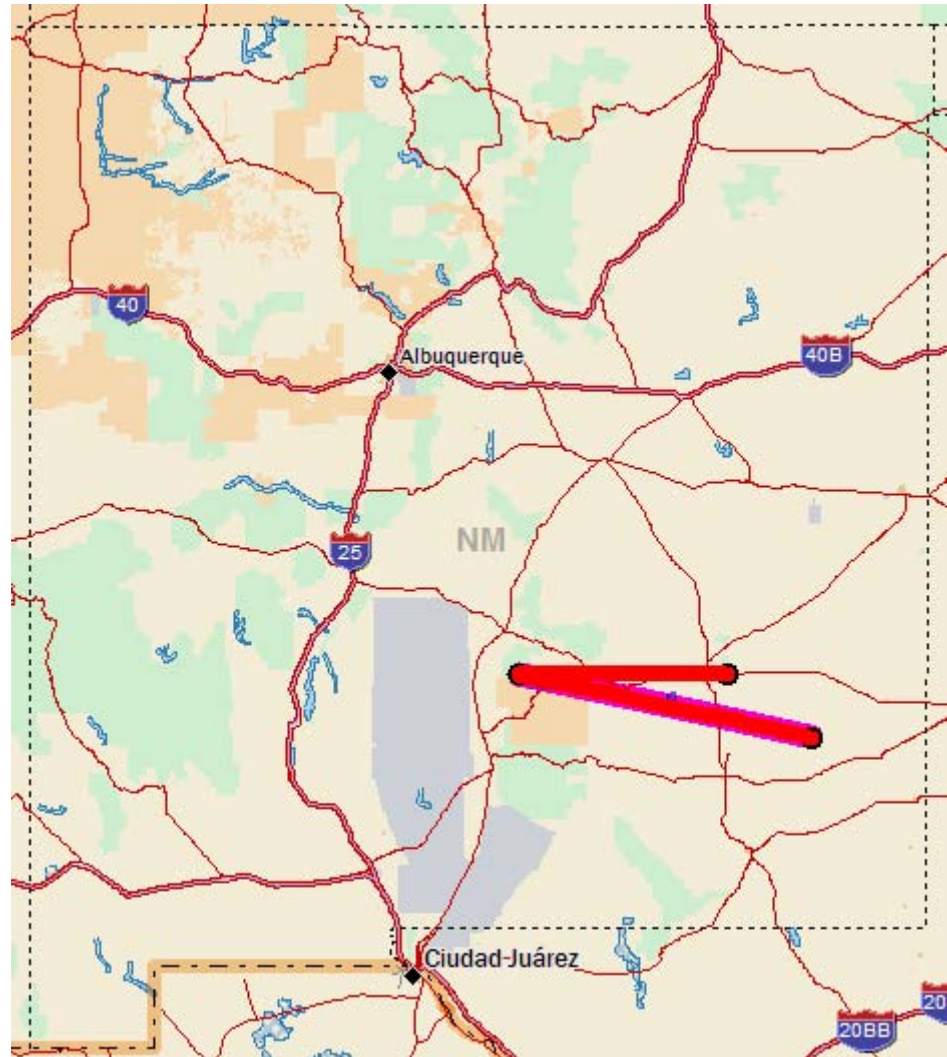


Longest TV Band Link (116 mi.)

WPNI810:

- TV intercity relay, formerly licensed to Acme Television License of New Mexico
- two paths
- Buck Peak/Ruidoso to Roswell, 130 km (81 mi.)
- Buck Peak/Ruidoso to rural Chaves County, 186.5 km (116 mi.)
- Both use 62 dBm EIRP and 18 dBi gain antennas
- Buck Peak 2700 m higher elevation than rural Chaves County path end

10/27/09



Path Length Modeling

- With urban power limits (24 dBW/6 MHz), modeling indicates path lengths of ~40 miles w/ 99.995% reliability
- With rural power limits (35 dBW/6 MHz), modeling indicates path lengths of ~70 miles w/ 99.995% reliability
 - Distances can be greater from mountain-top locations
 - Distances can be shorter depending on terrain roughness and multipath conditions
 - Rain fading and atmospheric absorption not a factor at UHF (but are factors for microwave bands)

Microwave Path Lengths

Using FCC's ULS database for Utah

Band	# Links	Avg. Length (km)	Max. Length (km)	Ant. Gain (dBi)	Ant. Size (feet)
UHF TV	25	51.1	186.5	16-18	3'x5.5'
6 GHz	1,652	51.6	166	38.8-46.4*	6'-15'
11 GHz	682	25.1	99.7	33.7-49.8	4'-10'
18 GHz	318	11.9	48.1	30-48.5	8'
23 GHz	176	4.2	20	30-46.9	1'-4'

- 32 links > 130 km (80 mi.): all use 42-45.6 dBi gain antennas (10'-15')
- 313 links w/6' antennas: avg. len. 32 km, max 100 km

TV Band vs. Microwave Antennas

Smaller, Lighter, Less Expensive



PR-TV series

PARAFLECTOR® ANTENNA

15.5 to 17 dBd gain
470 to 862 MHz



P10-102-P7A

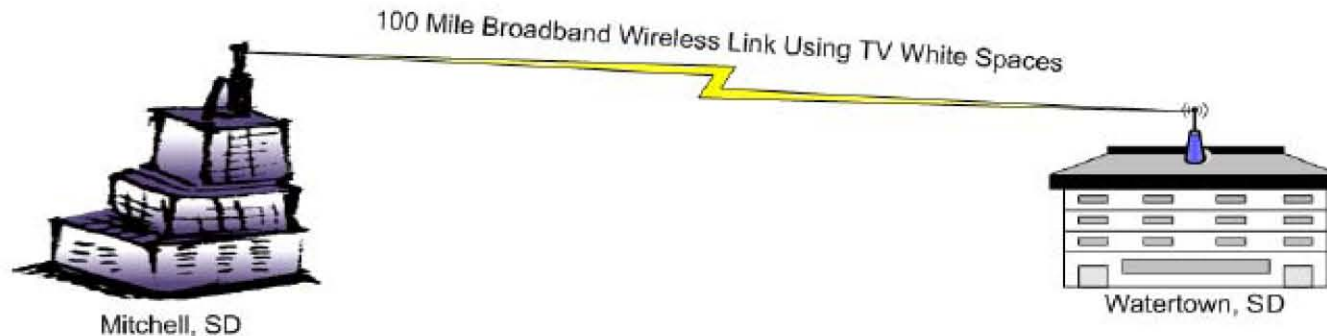
Parabolic Antenna

47 dBi
10.2-10.7 GHz

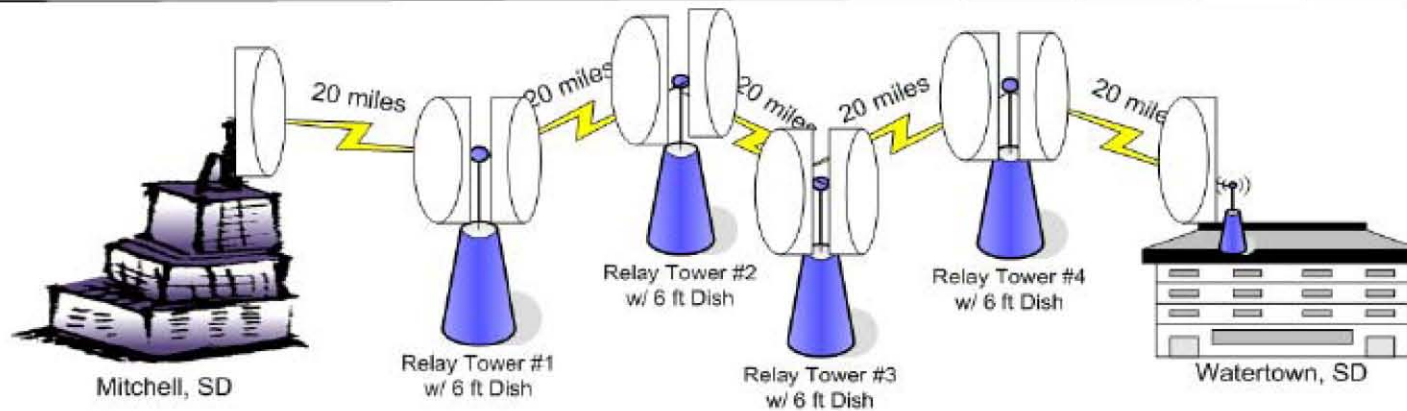


PR-TV	Antenna	P10-102-P7A
1.7 X 0.9 m (68" X 36")	Size	3 m (10 ft) diameter
38 lb.	Weight	317 lb.
\$1,664 for two, plus installation	Cost	\$10,940 for two, plus installation and weather shielding; similar shielded antenna – HP10-107-D1A – \$26,960 for two

100 Mile broadband connection cost comparison



100 Miles using TV White Spaces (450-698 MHz): Small lightweight grill-style antenna fits on building/tower. Cost <\$100,000-200,000



6 GHz or 3.65 GHz . Total cost: >\$3million. Fiber Optic costs even more!

Spectrum Usage – What's Available

Frequencies	Typical Path Length	Maximum Channel Bandwidth	Maximum Channel Capacity (typical)	Minimum Dish Diameter	Typical Weight, including mount
400 – 700 MHz (in Progress)	30 - 75+ Miles	6 MHz	25 Mbps*	< 3x6 Ft (smaller available for different applications)	< 35 lbs
4 GHz	20+ Miles	20 MHz	DS-3+	8 Ft	500 lbs
6.1 GHz	20+ Miles	30 MHz	OC-3	6 Ft	360 lbs
6.7 GHz	20+ Miles	10 MHz	DS-3	6 Ft	360 lbs
10 GHz	10 Miles	5 MHz	16 x T1	2 Ft	33 lbs
11 GHz	8 Miles	40 MHz	OC-3	2 Ft	33 lbs
18 GHz	4 Miles	80 MHz	OC-3, OC-3+	2 Ft	33 lbs
23 GHz	2 Miles	50 MHz	OC-3	1 Ft	21 lbs
24 / 39 GHz	1.5 Miles	200-700 MHz	1 Gbps	9" (in market)	< 20 lbs

* Assumes 64 QAM. 50 Mbps achievable by using two 6 MHz TV channels or two antennas with different polarizations;
 > 40 Mbps may be achievable with 128 QAM over shorter distances



Proposed Technical Rules for Licensed, Fixed Use of TV White Spaces

October 26, 2009

Summary of Proposed Rules

1) **Part 101 Site-Based Licensing**: Fixed use would be licensed on a site-by-site basis under Part 101. Applicants would be subject to frequency coordination with other Part 101 fixed service licensees, pursuant to procedures outlined in Section 101.103(d). Applicants also would need to demonstrate that their proposed Part 101 fixed operations will protect existing primary and secondary incumbents in other services, as discussed below. The licenses would be granted for ten-year, renewable terms, and each licensed site would need to be placed in operation within eighteen months of licensing.

2) **Frequencies/Channels**: Fixed use would be licensed only on UHF TV Channels 21-35 (512-596 MHz) and 39-51 (620-698 MHz). Fixed use channels would be 6 MHz wide and align with the UHF TV channels. In rural counties, six vacant channels second or greater adjacent to a TV broadcast station licensed under Part 73, Subpart E would be made available for licensed, fixed use provided such use would protect existing incumbents in other services as discussed below.¹ In addition, in all counties, all vacant channels third or greater adjacent to a TV broadcast station licensed under Part 73, Subpart E would be made available for licensed, fixed use provided such use would protect existing incumbents in other services as discussed below. Fixed use operations also could be licensed in other unserved and underserved areas where spectrum remains unused, as determined by the FCC. The designation of urban and rural counties would be based on existing PCS and cellular rules (*i.e.*, rural counties are counties that have population densities of 100 persons or fewer per square mile, based upon the most recently available population statistics from the Bureau of the Census. *See, e.g.*, Section 24.232(b).).

Contiguous channels, if available, may be aggregated to obtain a bandwidth greater than 6 MHz. For contiguous channel applications, the applicant must submit as part of the original application a detailed plan indicating how the bandwidth requested will be utilized. In particular, the application must contain detailed descriptions of the modulation method, the total data throughput (specified for each link), the channel time sharing method (if applicable), and any error detecting and/or correcting codes. Further, any contiguous channel applications must include a separate analysis of the spectrum efficiency, including both information bits per unit bandwidth and the total bits per unit bandwidth.

3) **Power Limit**: On any authorized frequency, the average power delivered to an antenna in this service will be the minimum amount of power necessary to carry out the communications desired. The average EIRP on any authorized frequency would be limited to 24 dBW/6 MHz in urban counties and 35 dBW/6 MHz in rural counties.

¹ There may be rare instances of rural areas that have few vacant channels, and the Commission could limit the total channels available for licensed, fixed operations in such areas to no more than one-half of the second or greater adjacent channels.

4) **Antenna Requirements:** Vertical polarization, horizontal polarization, and cross polarization would be allowed. If multiple polarization modes are used on the same frequency at the same location, the maximum permitted average EIRP would be reduced to keep the total power limited to 24 dBW/6 MHz in urban counties and 35 dBW/6 MHz in rural counties. The transmitting antenna must comply with the following antenna standards, which would apply in both the azimuth (horizontal) and elevation (vertical) planes:

Maximum beamwidth to 3 dB points: 25°

Minimum antenna gain: 15 dBi

Minimum radiation suppression from centerline of main beam:

15° - 20°	4 dB
20° - 25°	7 dB
25° - 30°	11 dB
30° - 40°	15 dB
40° - 55°	20 dB
55° - 150°	25 dB
150° - 180°	30 dB

5) **Protection of Other Operations in the Band:** Licensed, fixed use would be secondary to, and would be required to protect, all current and future “full service” TV broadcast stations (*i.e.*, stations licensed pursuant to Subpart E of Part 73) and Class A TV broadcast stations (*i.e.*, stations licensed pursuant to Subpart J of Part 73). Licensed, fixed use would share co-secondary status with analog and digital low-power TV (“LPTV”) stations, TV translators, TV booster stations, TV studio transmitter links (“STLs”), TV relay stations, TV translator relay stations, and Low Power Auxiliary Services stations (*e.g.*, wireless microphones). Secondary status stations generally would be protected from other secondary stations on a “first come, first served” basis, *except that* licensed, fixed use would protect LPTV stations, TV translators, and TV booster stations filed during a limited filing window, as discussed below.

a. **Existing Part 73, Subpart E TV Broadcast Stations.** Licensed, fixed operations would be required, at a minimum, to protect co-channel and first-adjacent channel TV broadcast stations, just as DTV broadcast stations must protect each other. That is:

- Licensed, fixed co-channel or adjacent-channel operational endpoints and the path length between endpoints would not be permitted within the 41 dBμV/m noise-limited service area contour of a DTV broadcast station, as defined in Section 73.622(e).
- Licensed, fixed operations may not exceed, at any location within the DTV broadcast station’s noise-limited service area contour, the desired-to-undesired (D/U) signal ratio thresholds contained in Section 73.623(c)(2) for co-channel DTV-into-DTV (D/U of +15 dB), lower first-adjacent channel DTV-into-DTV (D/U of -26 dB), and upper first-adjacent channel DTV-into-DTV signals (D/U of -28 dB).
- Licensed, fixed operations that operate with endpoints with antenna height above average terrain (“HAAT”) less than 152 meters (500 ft.) can demonstrate the necessary D/U protections by providing a minimum

buffer distance of 19.3 kilometers (12 miles) from all adjacent channel DTV broadcast station noise-limited service area contours (adjacent channel frequencies based on -28 dB protection for DTV broadcast stations) and a minimum buffer distance of 67.6 kilometers (42 miles) from all co-channel DTV broadcast station noise-limited service area contours (co-channel frequencies based on 15 dB protection for DTV broadcast stations).

b. **Existing Part 73 Subpart J Class A TV Broadcast Stations.** Licensed, fixed operations would be required, at a minimum, to protect co-channel and first-adjacent channel Class A TV broadcast stations, just as Class A TV broadcast stations must be protected from other TV stations. Thus, Part 73 Subpart J Class A TV broadcast stations must receive, from licensed fixed operations, protections that meet or exceed the Class A protections articulated in Sections 73.6012-73.6019.

c. **New DTV Broadcast and DTV Broadcast Station Maximization/Relocation Requests.** New licensed, fixed stations may not object to, and must protect, any new “full power” DTV station or an existing DTV station’s maximization or relocation request. However, if a new DTV station, or maximization or relocation of an existing DTV station, is implemented after June 12, 2011, then the DTV licensee must provide at least 120 days’ advance notice of such changes to the fixed service licensee to ensure that the fixed service licensee’s network is reconfigured as necessary. Class A station facility change/relocations shall receive, from licensed fixed operations, protections that meet or exceed the Class A protections articulated in Sections 73.6012-73.6019.

d. **LPTV, TV Translators, and TV Booster Stations.** New licensed, fixed stations must protect all existing LPTV, TV translators, and TV booster stations as well as the following “grandfathered” secondary stations:

- all LPTV, TV translators, and TV booster stations in operation by June 12, 2010;
- all LPTV, TV translators, and TV booster stations that have been granted construction permits by June 12, 2010; and
- all LPTV, TV translators, and TV booster stations for which applications are filed in the first six months after the opening by the FCC of a new application filing window, provided such window opens no later than June 12, 2011.

Licensed, fixed co-channel or adjacent-channel operational endpoints and the path length between endpoints would not be permitted within a 8 kilometer (5 mile) buffer surrounding the “grandfathered” station’s 74 dB μ V/m noise-limited service area contour.

e. **Low-Power Auxiliary Stations, Including Wireless Microphones.** Licensed, fixed stations must coordinate with Low-Power auxiliary stations whose locations are registered with the FCC or frequency coordinators. In order to accommodate the temporary and/or transient use of Low-Power Auxiliary Stations, licensed, fixed devices will also: 1) not operate on UHF TV Channels 36 through 38 nor in the first-adjacent channels to DTV stations; 2) provide a 30-day coordination notice, prior to system turn-up, to any previously-registered wireless microphone and production venues within 8

kilometers (5 miles) of the fixed link path and its endpoints. Any potential frequency interference issues that arise from the coordination notice will be worked out by the parties affected.

f. **Medical Devices and Healthcare Facilities.** Licensed, fixed stations are prohibited from operating on Channel 37, which is set aside for radio astronomy and wireless medical telemetry service (“WMTS”) use, and on the first-adjacent Channels 36 and 38.

g. **TV STL and Relay Links.** Licensed, fixed stations must protect existing TV STL and relay links, as well as “grandfathered” TV STL and relay links, in operation by June 12, 2010. New TV STL and relay links authorized after June 12, 2010 would need to be coordinated with and protect previously-existing fixed, licensed stations or obtain the consent of the fixed station licensee to operate. However, every effort should be made to accommodate coordination requests from TV STL and relay links that must be moved to another channel as a result of the DTV transition.

h. **Other Licensed, Fixed Operations.** Any pre-existing licensed, fixed operations shall receive coordination protection in accordance with Section 101.103 frequency coordination procedures.

i. **Cable Television Operations.** The cable industry will establish a voluntary database of CATV headends which will include, at minimum, the latitude and longitude of each headend, a list of the over-air television stations which are received there, and the azimuth direction towards which the receiving antenna for each television station is pointed. Licensed, fixed stations must adequately protect against interference with reception of over-air television programming at any headend listed in the database. This may be demonstrated by coordination with each individual headend for which the technical design of the licensed, fixed station predicts that the field strength of the licensed, fixed station, as measured at the headend location, will be greater than +19 dBμV/m on any over-air television channel that is received at a given headend or greater than +75 dBμV/m on any channels that are adjacent to any channel received at the same headend.

Adequate protection will be demonstrated if the signal of the licensed, fixed station is at least 23 dB below the same-channel over-air television signal as received at the headend, and no greater than 33 dB higher than higher or lower adjacent channels of such signals as received at the headend, as measured at the download of the headend receiving antenna used for the desired station. The over-air signal strength reference for this comparison will be that which is achieved 99% of the time as determined by extended signal level tests.

j. **Television Receiver Direct Pickup.** In general, licensed, fixed operations shall be designed to produce no more than 99 dBμV/m at the external wall of any building where a television receiver is likely to be located (*e.g.*, residences, apartment buildings, office buildings). The field strength from a licensed, fixed operation can be calculated considering a number of factors, including the following: path loss (distance from

transmitter), transmitter power, antenna gain/suppression at the relevant angle, and terrain attenuation.

6) **Protection from TV Bands Devices:** Licensed, fixed use would receive interference protection from unlicensed TV Bands Devices (“TVBDs”) pursuant to the same framework that the FCC has adopted for Broadcast Auxiliary Services links under 47 C.F.R. § 15.712(c). Thus, for licensed, fixed use point-to-point receive sites appearing in the Commission’s Universal Licensing System, TV Bands Devices may not operate within an arc of +/-30 degrees from a line between the licensed, fixed use receive site and its associated permanent transmitter within a distance of 80 km from the receive site for co-channel operation and 20 km for adjacent channel operation. Outside this +/-30 degree arc, TVBDs may not operate within 8 km from the receive site for co-channel operation and 2 km from the receive site for adjacent channel operation. The transmitter and receiver coordinates, channel number, and call sign for each new site-based point-to-point link will be added to the TV bands database.